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ABSTRACT

The RAND study of change agent programs, explored the innovative process in local school systems. Specifically, it sought to identify the impact of these federal programs on local educational systems: the Elementary Secondary Education Act, Title III; Vocational Education; ESEA Title VII (Bilingual Projects); and the Right to Read Program. This paper provides a theoretical perspective for the Rand study by: (1) analyzing knowledge of planned educational change; and (2) proposing a conceptual model of factors that affect the change processes within school districts. Following the introduction, section 2 first assesses the literature on program and policy studies and then critically examines the analytical literature on planned change in education to select and formulate major theoretical issues. Section 3 suggests an approach to investigating these concerns and proposes a conceptual model. It is argued that the relationship between federal policy and the desired objective cannot be systematically formulated without analysis of change processes within the school district. In particular, the change process follows three stages: support, adaptation, and incorporation. Two figures and a 17-page bibliography are included. (LMI)

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IMPLEMENTING INNOVATIONS: REVISIONS FOR AN AGENDA FOR A STUDY OF CHANGE AGENT PROGRAMS IN EDUCATION

P. Berman and M. W. McLaughlin

STUDY OF CHANGE AGENT PROGRAMS

A WORKING NOTE

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PREFACE

The Change Agent programs* present an implicit challenge to the nation's education system: the status quo is inadequate -- change in local practices is required. But these federal change agent policies are constrained to some (unknown) degree in that they are *temporary systems* designed to work reform *from within* or *through* the existing educational system. In other words, the education system has been given an assignment of self-renewal -- of translating the intent and spirit of these ambitious federal initiatives into substantive and effective new practices.

The relatively small amounts of money expended by change agent programs seem to have positively affected the *rate of adoption* of new projects, but to have had disappointingly little impact on student achievement. Yet, it is not clear that adoption is a reliable forecast of *actual use*, or that the sorts of changes which are being implemented with federal dollars are those which would be expected, *a priori*, to lead to significant differences in student achievement. If local schoolmen tend to view federal funds as contributing "slack resources," for example, it is to be expected that these monies will be directed at ancillary services, not at the mainline educational activities which could significantly affect student outcomes. It may be that schools are being held accountable for something they cannot do given the present arrangement of policies, incentives, and institutional structures.

In addition, it is possible that "change" of the type desired by federal policy makers *is* taking place -- but at a different pace than expected. It may be that change in local practice is both occurring at an *incremental* rate and is *accumulating slowly* across the system, and is thus overlooked because our present concepts of "change" are not sufficiently discriminating. The Rand study, sponsored by the U.S. Office of Education, of Change Agent Programs is directed towards acquiring a more basic understanding of the process of innovation in local educational systems and, thereby, providing guidance for policymakers. The purpose of this paper is to provide a theoretical perspective for the Rand study by (a) analyzing the state of

*ESEA Title III, Vocational Education, ESEA Title VII (bilingual), Right to Read.

knowledge of planned change in education and (b) proposing a conceptual model of factors affecting processes of change within school districts.

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I. INTRODUCTION

This study addresses a problem identified by educators, policymakers, and critics of federal education policy alike: self-conscious federal efforts to promote innovation in local educational practices have resulted in disappointingly little consistent or identifable improvement in student outcomes.

A number of alternative (but not entirely exclusive) possibilities may explain the apparent failure of innovative practices:*

- o Schools are already having the maximum possible impact; new practices, then, cannot be expected to make a difference.
- o Innovative ideas and technologies tried thus far are inadequate or underdeveloped.
- o Change in student outcomes *has* occurred, but the measurement instruments are inappropriate or insensitive.
- o Innovative practices have not been properly implemented.

The weight of the first explanation, that schools are already doing the most they can, rests on the goals assumed for education. For example, those who posit social equity as a major goal of education view the outcomes of the past decade's innovative efforts as persuasive evidence that new educational practices cannot reduce inequalities in rates of learning and achievement which accompany unequal background factors. Many holding this view have thus concluded that education is an ineffective and inefficient focus for federal intervention efforts and that the government should turn to alternative social policies to remedy social inequities.**

Others who also assume that a primary goal for education is reduction of social inequities contend that the present system is structured so as to preserve and perpetuate these social class differences, and thus that schools are working very efficiently. In this view, social equity can be

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*The term "innovation" has been used by different authors -- and often by the same author -- to refer to a goal and a means, an object, and a process, an input and an output. In this paper, and in the Rand study, we define "innovation" as a practice or plan which is new to a particular school or local educational agency (LEA) and which, because it is new, requires (or assumes) some degree of modification (or change) in the behavior of principal actors.

**This view is often called "Colemanism" in that the disappointing outcomes of innovative projects were seen as confirmation of the conclusion many drew from the 1966 Coleman Report.

achieved through schooling only if large scale changes revolutionize the present educational system.

The second explanation assumes that schooling can be made more effective and interprets the apparent failure of new practices in terms of inadequate technology or underdeveloped practice. Some believe that present strategies are on the right course but that innovations have not produced the hoped-for-results because they have not been adequately financed, developed, not given sufficient time to mature. Others subscribing to this general explanation believe that present innovative practices are not succeeding because "best practices" have yet to be invented, and theories of learning or instruction are underdeveloped. The establishment of the National Institute of Education can be viewed as testimony to the belief that the present shortcomings in educational practice can be remedied by concentrating more money and energy on basic research and theory development. Underlying the technological view is an assumption of a rational educational system eager to (and capable of) change. Thus, promoting improvements would require increased R&D investment, increased financing of local experimental projects, increased flow of information, and increased patience.

The third explanation focuses on the inadequacy or inappropriateness of pessimistic evaluations of innovative programs. Many people, especially educators, having direct involvement with innovative programs, argue that significant change in student outcomes *has* occurred but that evaluations fail to identify these changes because they suffer from some form of measurement error. Others holding this view make a somewhat different argument: that "change" of the type desired by federal policy makers *is* taking place -- but at a different pace than expected. They contend change is occuring in *local* practices at an *incremental* rate and is *accumulating slowly* across the system, and is thus being overlooked. Both variants of this explanation contend that evaluations done this far are unsound or premature and cannot legitimately serve as a basis for the formulation of federal policies. In this view, accurate assessment of the impact of innovative programs awaits the development of more sophisticated and sensitive measurement instruments and research strategies.

A fourth explanation suggests that while the outcomes may be disappointing, they do not accurately reflect the potential of innovative ideas because many innovations are not implemented according to plan. This interpretation stresses the complexity of the implementation process and locates the essence of the problem not in inadequacies of innovative plans but in the bureaucratic nature of the educational system itself. This view sees the educational system as highly resistant to innovations, as likely to transform innovative projects into "new ways of doing the same thing," as generating much apparent *movement* but little effective *change* in local educational practices and, hence, little improvement in student outcomes. Therefore, improving educational results would require policies that promote change in the educational system and in the way it implements innovations.

It is not possible to further structure the problem of the effectiveness of innovation on the basis of the empirical evidence gathered thus far. As the third view maintains, evaluations of innovative practices are beset with conceptual and methodological problems: much of the evidence is contradictory; evaluations have been found to be incomplete or in error; important variables have been misspecified; dependent and independent variables are ambiguous; the relationship of treatment to educational goals is uncertain; measurement or method is not comparable across studies. However, these empirical difficulties confound the fundamental problem: the absence of systematic theory of planned change.

Without such a theoretical perspective, federal policy has few reliable guidelines. Thus, the broad objective of the Rand study of Change Agent programs is to acquire a more systematic understanding of the process of innovation, generally, and specifically to identify the impact of these federal programs on local educational systems. As a requisite to Rand's research, this paper analyzes the state of knowledge of educational innovations and proposes a conceptual framework for directing research.

Section II first assesses the literature comprised of program and policy studies and, then, critically examines the analytical literature on planned change in education to select and formulate major theoretical issues. Section III suggests an approach to investigating these research

concerns and proposes a conceptual model of factors affecting change processes in a local school district.

II. LITERATURE ON EDUCATIONAL INNOVATIONS

The literature on educational innovations is vast and may be increasing at a faster rate than the innovations themselves. Rather than attempting a thorough and comprehensive review of this immense and highly redundant literature, this section assesses the state-of-the-art of knowledge about innovations in education. We wish to identify the main findings, the main issues, and the most promising conjectures. The educational innovation literature may be divided into two broad categories: project or policy studies, and analytical treatments of the problems and process of planned change in education.

A. PROJECT AND POLICY STUDIES

Most of the literature on change in education consists of single case studies which evidence little methodological sophistication - research characterized by Giacquinta as the "show and tell" literature (in Kerlinger, ed., 1973). This large and widely dispersed literature chiefly comprises local education agency (LEA) project reports (many of which can be found in ERIC); articles in education journals (such as *Teacher*, *Elementary School Journal*, *National Elementary Principal*); State Education Agency (SEA) and U.S. Office of Education (USOE) publications containing descriptions of "exemplary" projects (such as *American Education*, the "It Works" series; SEA annual reports of ESEA projects); and compendia of "exemplary" or "innovative" programs (such as MacAdam and Fuller, eds., 1970).

The case study literature abounds with claims of "success", but data are seldom presented to document or support these conclusions. Indeed, the great majority of these reports more nearly resemble public relations documents rather than objective evaluations of project outcomes.*

*An advocacy mode of reporting is not surprising, however, in light of the fact that this avalanche of project evaluations was precipitated by federal requirements to report, rather than by locally initiated inquiries into project accomplishments.

Although there appears to be some consensus about broad strategies which have been "successful"---i.e., individualized instruction; open classrooms; team teaching---on balance, this anecodotal literature is intriguing but it is neither convincing nor helpful to our study. Because the case studies attempt to *describe* or *advocate* change---not to test theories of change or identify components of success or failure---neither success or failure can be understood in a way which enables educators or policy makers to learn from past experience. Further, because these evaluations implicitly adopt a "project model", which looks at innovative practice apart from its institutional context, it is difficult to generalize project outcomes to other settings. In short, the case study literature paints innovative project accomplishments in glowing broad-brush terms, but it provides little information about specific successful innovative strategies, about the components necessary to success, or even about what comprises success.

The credibility of these evaluations is further diminished by the fact that more detailed and sophisticated reviews and analyses fail to confirm these very encouraging conclusions. There is unsettling evidence that where "success" is claimed, closer inspection reveals that project outcomes are not significant or lack stability over time. For example, The American Institute of Research (Hawkridge, et al. 1968, Wargo 1972) reviewed over 1000 supposedly exemplary programs in order to identify 100 candidates for further study. The subsequent in-depth investigations found that cognitive gains, where they could be certified, were not impressive and that the majority of the programs which A.I.R. judged "successful" in one year did not demonstrate the same success upon re-investigation in following years, even though the specified independent variables remained constant.

Nor does the high level of success reported for new strategies (by the case study literature) find support in those complilations or syntheses which assess the findings of research reports meeting more rigorous methodological standards. Gage (1963), for example, marshals an impressive amount of evidence from earlier years which suggests that innovative strategies to enhance student learning seldom produce impressive results. J.M. Stephens (1967) also concludes on the basis of a

review of the outcomes of innovative projects (instituted as long ago as 1897) that the lack of variation in the impact of "new" educational practices on student learning is a matter of common knowledge. He remarks:

> It is part of the folklore that, in educational investigations, one method turns out to be as good as another and that promising innovations produce about as much growth as the procedures they supplant, but no more. (p. 10)

Travers (1973) and Averch et al. (1972), reviewing post-Elementary and Secondary Education Act (ESEA 1965) practices and innovations, fail to provide exception to these conclusions about the lack of differential effectiveness. Averch states:

> Research has not identified a variant of the existing system that is consistently related to student's educational outcomes. (p. 154)

The widespread opinions about the disappointing lack of effectiveness of new educational strategies are not based primarily on these reviews, however. These judgments came about in response to the disheartening results of federally initiated inquiries into the impact of federal education policies. Conclusions that "schools don't work" (to overcome background differences) and that "schoolmen don't know what to do" (with new federal resources) reflect in largest measure discouraging evidence compiled by large-scale federal evaluations of the impact of project Head Start and ESEA Title I (Westinghouse Learning Corp., 1969; Mosbaek, et al.; USOE, 1970; Glass, 1970; Wargo, 1972). These federally sponsored analyses were unable to identify consistent or significant impact on student outcomes which could be attributed to participation in special programs funded with federal dollars.

As a result of the general lack of confidence in the anecdotal literature, and the disturbing evidence compiled by more rigorous or quantitative evaluations, two negative conclusions predominate a review of the program and policy studies, and the general commentaries on this literature:

- o Variations in student outcomes have not been consistently related to variations in treatments, once nonschool factors are held constant.
- o "Successful" projects lack stability and exportability.

These pessimistic assessments are subject to challenge on at least two grounds. First of all, it is perhaps unrealistic to expect either the absolute level of (mean) improvement or the rate of (mean) improvement to be high, particularly in the rather short time span of most innovative programs. Indeed (as we shall argue in more detail subsequently), given the highly stable nature of the educational system, one would expect to find only *incremental change* at the *leading edges*, and that such changes would *cumulate slowly*. The incorporation or institutionalization of the changes anticipated by federal policymakers, then, would be expected to occur gradually and over time, not in the October to May time frame employed by most evaluations.

Secondly, most of these studies suffer from serious methodological and conceptual difficulties that render pessimistic conclusions premature. Critical questions about their empirical validity have been raised and have not satisfactorily been answered. Since issues relating to the measurement instruments themselves and to the units of analysis have been widely treated, they will not be dealt with in this paper (see e.g. Levin, 1971, Cronbach and Furby, 1970). But the important possibility of a specification problem that would cause these findings to be specious has received less attention than it deserves. That is, if an evaluation of a program yields results of "no significant difference", it may be that the innovation project did not work, or it may be that all the important variables were not included in the evaluation model. Somewhere between the stated program inputs (which are specified) and the program impact (which is measured), something important may be effecting the relationship between theoretical input and actual output, but is not specified. Insofar as unspecified variables have important first order effects, their ommission can produce a finding of "no significant relationship" between success and the variables that are specified.

Lack of stability and exportability of project outcomes may mean that the evaluation was in error, or that the project was a random success. Lack of a significant relationship between treatment and student outcomes may mean that the treatment was ineffective. Or, the absence of measurable impact and the lack of project stability may be the result of *unidentified causal variables* that change over time within and across sites.

Indeed, we shall argue subsequently that *institutional variables* are not identified in policy or project evaluations and that these variables change within sites as the institution adapts to the project, and these variables certainly vary across sites.* Further, the project itself, as we will discuss later, can be expected to change over time, as the institution modifies the innovative strategy to accommodate the institutional structure and constraints. Thus the simple model implicit to most impact studies of innovative strategies---O = f(x) where O = outcome, x = treatment---could be expected to underestimate the effect of the treatment to an unknown degree. That is, if both treatment and institution adapt to each other over time, and also vary across sites, then

$$O = f(x,y)$$

$$x = f(y)$$

$$y = f(x)$$

where y represents institutional variables.

This model posits that simultaneous effects occur in the process of implementing an innovation and that endogeneous relationships are important to an accurate assessment of project impact. Where treatment and institutional variables are considered together in a series of simultaneous equations, institutional variables may be found to have a significant relationship to project outcomes - and more important - treatment may then be significant.

In sum, the findings presented by the program and policy studies do little more than suggest the overall problem of the Rand study---that of the apparent ineffectiveness and instability of innovative efforts. But this literature provides little help in our efforts to cast the problem

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*A related statistical problem arises from the need of policy makers for data to be presented in units of analysis susceptible to policy decisions and the subsequent aggregation of data to such levels as the school district which, in effect, average away---and thus omits---possible highly significant institutional variables.

in comprehensive and operational terms. On the basis of this literature, we are unable to decide to what extent the problem is an artifact of measurement error; is evidence of inherent limitations in production possibilities; is the result of implementation problems; is the result of slippage between treatment and goals; or is the product of premature assessment. In short, the evaluation literature marshals voluminous data to testify to the existence of serious difficulties in past efforts to bring about change in educational practices, but because of its project orientation and atheoretical character, this literature does not enable us to generalize from past experience or even to specify the nature of the problem in theoretically fruitful terms.

B. Analyses of Planned Change

The program and policy studies concentrate on the relationship between treatment variables and student outcomes; the analytical literature on planned change in education focuses instead on the *institutional aspects* of educational innovation.* This literature asserts that there are institutional factors which influence the success or failure of an innovative effort---quite apart from the "quality" of the innovative strategy itself. Although there is general consensus on this point, there is disagreement about which aspects of institutional behavior should be emphasized, and about how the problem of effecting planned change should be stated: one analytical approach emphasizes *adoption*, a second focuses on *implementation*.

The dominant school of thought concentrates on information development and utilization, and deals primarily with the formulation and specification of management principles which are expected to facilitate the adoption of innovations by educational institutions.

*Theoretical literature from outside the area of education, notably organization theory and the diffusion literature, has often been used by individuals concerned with educational innovation and with the formulation of theories of change.(e.g., Bennis, Benne and Chin, 1969; Bennis, 1966; Cyert and March, 1963; Rogers, 1962; Rogers and Shoenaker, 1971; are widely cited.) We are not specifically treating this theoretical literature in this discussion. Instead, we are concerned here with that literature dealing specifically (and practically) with the problems of planned change in education implied for the Rand study.

Ronald G. Havelock synthesizes the somewhat diverse notions comprising this perspective into four alternative models. Each model focuses to some extent on *pre-adoptive* behavior, or the behavior of schools before a decision to adopt is made, and on the "insufficient rationality" thought to attend planned change efforts. (Havelock, n.d.)

The first model, the Problem-Solving model, assumes that user needs are paramount in the selection and adoption of an innovative strategy. This model of planned change casts innovation in a "diagnostic" frame, and emphasizes search and selection processes. Demonstration of congruence between an innovative strategy and diagnosed need is presumed to result in adoption.

The second model, Social Interation model, focuses on patterns of diffusion,and assumes information in itself is an important (if not major) source of motivation to innovate. Exposure to information about a "better" practice, then, is expected to lead to adoption or trial.

The third model, the Research and Development model, is an explicitly rational model which assumes a rational sequence of goal setting, planning, implementation and evaluation. As in the preceding two models, needs assessment and the motivational aspects of information are stressed. This model assumes that the "consumer" is a more or less passive (but rational) receiver and implementer of ideas that seem to him to meet his needs.

A fourth model, the Linkage model, has been developed by Havelock to remedy the deficiencies he perceived in the preceding models. It draws from the preceding three but, in addition, deals with the incentives, behaviors, and goals of individual actors in the educational institution, especially as these participants respond to proposals for planned change. Havelock's "linkage model" begins to introduce notions of more realistic administrative behavior (e.g., Simon, 1957), but this model, like the other models, focuses almost exclusively on the behavior of principal actors and characteristics of the insitution *prior* to the implementation of an innovative strategy. Thus in this model too, the problem of effecting change is framed primarily in terms of bringing about the adoption of an innovation.

Underlying these four alternative notions of effecting educational innovation is a rational model of bureaucratic behavior which assumes

that members of the school organization constantly seek better practices, have reliable means of identifying superior procedures, and are eager and able to adopt proven innovations. Thus, given the existence of promising strategies, the major barriers to change are seen as deficiencies in:

- o planning, communication and dissemination
- o the quantity and quality of available information.

In our opinion, this essentially rationalistic view of educational innovation is unsatisfying for a number of reasons. For one, this formulation of the problem fails to provide an adequate understanding of the *modal* process of change in educational institutions. It is top-heavy on questions of adoption, planning and dissemination, and tends to slide over or ignore the issue of implementation or institutional adaption of an innovative strategy. But without understanding this latter process, we cannot learn from the success or failure of attempts to innovate, nor do we have a baseline notion to use in deciding when change has really occurred.

Second, it is not clear that the educational system possesses the type of selection mechanism posited by the rationalistic perspective. That is, the educational system does not have a market-type selection mechanism, or "profit maximizing" incentives; the "survival" of the institution is guaranteed by society. Within a LEA, there is no clear incentive to innovate, since it is not clear that those LEA's which do not innovate "fail". Conversely, actors within the LEA have disincentives to innovate insofar as outcomes of innovation are uncertain, and insofar as changing bureaucratic patterns involves personal risk. Indeed, a broad consensus agrees that the following characteristics of the educational change process hold, even though they are not consistent with the rational view:

- o Decisions to adopt or reject an innovation are seldom made on the *prima facie* merits of the innovation (Miles, 1964; Coleman, 1972; Rein, 1970).
- o The usual process of change is top-down; pressure for

> change is typically initiated outside the local school, rather than by school needs assessments. (Fullan, 1972; Sarason, 1971; Bennis, Benne and Chin, 1969; Wirt and Kirst, 1972).

Thus the special instance of the educational innovation suggests that many of the rationalistic assumptions about the role of information and the impetus to adopt are not consistent with the reality of decision-making in the local school setting.

Third, this conceptualization, which locates the essence of the problem of change in adoption, does not square with experience or with the conclusions of more theoretical treatments of educational innovation. There is persuasive empirical and theoretical evidence which suggests that adoption is only one, and in most instances not the most important, hurdle to overcome in successfully bringing about change in educational practices.

In contrast to the rationalistic perspective, a second school of thought on planned change defines the problem of successful innovation in terms of *implementation*. This variant of an institutional approach is represented by a small number of theorists who have examined the reality of educational innovation from the perspective of an *organizational* model of insitutional behavior. This research has begun to explore the dynamics within the institution and the characteristics of innovative strategies which affect the possibility of effecting planned change.*

These analytical case studies of educational innovations find on inspection that the most difficult and complex part of the problem of innovation has to do not with *pre-adoption* behavior, but with *post-adoption* behavior, or with the process of *implementation*. In almost all the instances studied, adoption was not at issue; problems of implementation dominated the outcome and the success of the innovative projects. The innovations typically were initiated with a high level of enthusiasm and support by faculty and staff, but these innovative plans failed to achieve their objectives because of difficulties and obstacles (most often prosaic and unanticipated) encountered during the course of project

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*N.b., Miles (1964); Gross, Giacquinta and Bernstein (1971); Sarason (1971); Smith and Keith (1971); Carlson, et al. (1971); Charters, et al. (1973).

implementation.

In addition, the organizational perspective on planned change contends that "resistance" to change does not cease to be an issue once a decision to adopt is made, but continues to exert influence throughout the process of adaptation and implementation. This model stresses the "dynamic conservativism"* of the school system. Thus, the regressive tendency of the system to fall back into pre-existing, or only marginally different, patterns of behavior---after the adoption of innovative strategies---is seen in this view simply as symptomatic of the fundamental character of the institution.** (Ginsburg, et al., n.d.; Coleman, 1972; Charters, et al., 1973; Wirt and Kirst, 1972; Kirst, 1972; Miles, 1964).

This somewhat different formulation of the essential problem of planned change---i.e., implementation as opposed to adoption---has lead to the identification of a different set of dimensions which are thought to be important to an understanding and promotion of successful change in educational practices. Although the role of information is not dismissed, in the organizational perspective the role of "knowledge" and communication in the outcome of an innovation is seen as secondary to:

- the role of principal actors
- the institutional structure of incentives and constraints
- the institutional policy setting
- characteristics of the innovation.

The lack of congruence between rationalistic models of change (such as those synthesized by Havelock) and what other researchers and theorists (n.b., Miles, 1964) describe to be the dominant problem of innovation, can be attributed in large measure to their somewhat disparate intellectual traditions. Whereas researchers such as Sarason, Smith and Keith, Charters, and Gross, et al., have attempted to structure the problem of educational

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*This term has been popularized by Schon (1972).

**This institutional attribute can provide one explanation for the lack of stability of "successful" projects found by Wargo (1972), as well as insight into the phenomenon of "pro forma" change. (Goodlad, 1970).

innovation inductively, the rationalistic perspective has for the most part deductively formulated management principles to guide innovation. The principles of knowledge utilization and production so developed rely heavily on the traditions and assumptions of the diffusion literature---a conceptual framework which has only very general and limited applicability to innovation in education (n.b., Rogers, 1962; Rogers and Shoemaker, 1971; Havelock, 1969).

Drawing primarily from the fields of medicine and rural sociology, the diffusion literature frames the central problem of innovation in terms of *adoption*, and the central issue for analysis as the identification of differential *rates of adoption*. Underlying this view is the assumption that an "innovation" is a relatively stable "technology" or "product", and that once adopted, an innovation will generate its own momentum and proceed (more or less mechanically) through predictable stages of implementation, which will end with a decision to continue or terminate. Innovative strategies, then, are presumed by the diffusion literature to be essentially "self-winding"; an innovation's *prima facie* merits are assumed to be their own brief.

On inspection, however, there are important practical differences between a "technology" and an educational innovation. These dissimilarities raise questions about the relevance of the diffusion literature (and its assumptions) for innovation in education.

A "technology" or a "product" can be thought of as possessing the following general attributes:

- clarity and specificity of goals
- specificity of treatment
- a clear relation between treatment and outcome
- passive (on the whole) user involvement
- a high level of certainty of outcome
- an individual adopter.

Because of these characteristics, a technology or a product is usually *invariate* in its implementation and in its outcome from one context to another. (See Gruber and Marquis, 1969.)

In contrast, innovative strategies in education (unlike technologies---a new pill, a new airplane, or a new hybrid seed) tend *not to be invariate*. Theorist Matthew B. Miles (1964) argues, for example, that educational innovation should be thought of as evolutionary:

> The installation of an innovation in a system is not a mechanical process, but a developmental one in which both the innovation and the accepting system are altered. (p. 647)

Indeed, in comparison to "technologies", educational innovations may be said to possess the following general attributes:

- o treatments are incompletely specified
- o outcomes are uncertain
- o target groups vary
- o active user involvement is required
- o the adopter is not an individual, but a policy system or policy units
- o relationship of project treatment to overall institutional goals is unclear or unspecified.

Although one can point to "technologies" which have been called educational "innovations" (e.g., some kinds of audio-visual equipment, or computerized accounting procedures), unless the adoption of such educational hardware anticipates a concomitant change in patterns of behavior, then we will argue that these products are not innovations. Even innovations which are primarily technological in nature are subject to the host of implementation problems (albeit to a lesser extent) which attend innovative strategies focusing on explicit behavior changes or require extensive new learning on the part of the user (e.g., differentiated staffing projects).

Because of the nature of an educational innovation, the decision to adopt does not resolve the problem of innovation; this decision is only the beginning of a process which exhibits a high degree of instability and variability.*

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*Indeed, the sheer volume of the anecdotal case study literature provides evidence that adoption is not a problem.

Experience has shown that innovative strategies not only change over time within sites, but that they also display an enormous amount of variability from one institutional setting to another.*

The variability in institutional response to an innovation---the result of different sets of actors and different institutional patterns of routinized behavior---creates what we will call a *"mutation phenomenon"*. That is, innovation A^1 may become innovation A^2 when it is implemented in another setting, and it may be again mutated to become A^3 as it is carried out at yet another site. Or, innovation A^1 may become innovation A^2 or A^3 over time within the same site. Further, a panel of independent observers (or even the participants themselves) would be unlikely to reach consensus as to whether or not---in operation---$A^1 = A^2 = A^3$.**

In sum, the nominal adoption of an innovation cannot be assumed to provide an accurate forecast of its actual implementation or use. The process of implementation in the instance of educational innovation is essentially a (two-way) process of *adaption* in which the innovative strategy is modified to suit the institution, and the institution changes to some degree to accommodate the innovation. Therefore, the implementation of educational innovation can be thought of as an *organizational process* whose end product, in the case of a successful innovation, would be an altered institutional arrangement and an innovative strategy modified to suit that arrangement.

The existence of this mutation phenomenon underscores the extremely limited utility of program and policy impact studies that look only at

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*For example, in an analysis of the Head Start/Follow-through Planned Variation Experiment, which was designed to test the differential effectiveness of explicitly different models of education practice, Huron Institute staff (Cambridge, Massachusetts) found that model-to-model comparisons were extremely difficult to make because of the high degrees of variability which occurred *within* each specific model as it was implemented in multiple sites.

**We note that the educational system does not possess---at least in the short run---a "survival of the fittest" mechanism that would select out undesirable mutations.

the relationship between treatment and student outcomes. As Levin (1971) argues:

> ...the lack of similarities among the production techniques used by different schools may mean that neither average nor frontier findings can be applied to any particular school. Indeed, in the extreme case, each individual school is on its own production function, and evaluation results for any group of schools will not be applicable to individual schools in the sample. (p. 23)

The highly variable and unstable nature of educational innovations implies that it is misleading, unfruitful, and a "serious error" to evaluate the effectiveness of an innovative strategy apart from its institutional setting; that both the nature and the outcome of an innovative plan are determined by the complex and little understood process of implementation or institutional adaptation.

If it is true that innovations are not invariant but adapt to the institution, as well as lead to modifications in the institution, then it is possible that educational innovation may take place in a nominalistic world, in which comparisons and generalizations are risky at best. Or, on the other hand, it may be that what are substantively different "mutations" of innovative plans can be seen as the product of common institutional structures and processes. If this is the case, then questions of implementation and patterns of institutional response to innovations become central to an identification of policy levers which can effect the incidence and outcome of innovation as well as to a systematic understanding of the process and outcome of planned change in education.

III. AN INSTITUTIONAL APPROACH

Our analysis of the findings and failings of the state of the art of educational literature on innovations leads to the following assessment: (1) research on the general effectiveness of schooling provides little guidance on how to change educational practices; (2) impact oriented studies of innovative projects have not produced generalizable findings because they fail to deal with the interaction of the project with its institutional setting; and (3) implementation problems dominate the outcomes of change processes in the educational system. Therefore, we believe research should be directed towards understanding the implementation of innovative projects within school districts, and how policy might affect implementation.

Unfortunately, no theory or analytical understanding of implementation exists in the educational literature or in other literatures (Pressman and Wildavsky, 1973). At best, educational experts have accumulated wisdom in the form of principles, guidelines, and advice for change agents (Havelock, 1973). Without denying the validity of any particular commonsense procedure, such advice usually suffers from both inconsistency and incompleteness: implementers are often faced, on crucial matters, with principles leading to divergent alternatives, and inadequate information (and understanding) to choose among them (Simon, 1957). Though the need for a more systematic understanding of implementation is, thus, evident, the only clues available as to how to develop such an understanding are those suggested by the institutional literature reviewed at the close of the preceding section. Drawing upon our preceding analysis of this literature and upon the more general literature on organization theory and on diffusion of innovations, this section first treats preliminary issues that must be raised prior to research on a relatively unexplored area -- namely, what should the focus of research be? What approach should be taken? What questions need to be asked? Secondly, a conceptual model of factors influencing change processes in the LEA is proposed as a guide to research.

A. RESEARCH FOCI

The sheer complexity of the educational system causes the issue of how research should be focused to be a major concern. At one end, we are

interested in the ways in which Federal policy can affect education; at the other end, we need to investigate how specific innovative projects affect students. In the ideal, one would like to trace (or predict) how Federal policy inputs work their way through the various levels and jurisdictions of the educational system down to the teacher in the classroom. Accomplishing this ideal is unlikely. Nonetheless, some sense of the interdependencies throughout the system is necessary if more effective and efficient policy is to be designed. Accordingly, this section suggests what aspects of the overall system should be researched and what simplifying assumptions about the nature of the interdependencies can be made.

The elementary and secondary educational system is an organization of organizations -- and, for convenience, will be called a *multi-organization* -- in the sense that it is composed of:

- a variety of suborganizations each having its jurisdictions and responsibilities, both vertically and laterally
- these suborganizations are tied together by a common institutional framework.

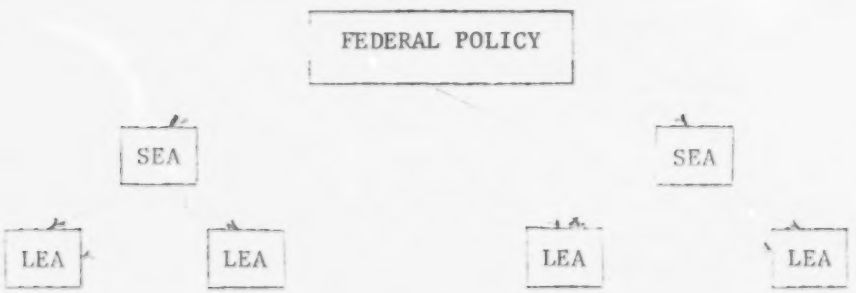
Even excluding such ancillary groupings and organizations as community groups, graduate and professional schools, technical schools and colleges, professional associations and teachers' unions, the list of suborganizations is impressive in numbers and variety of functions:

- the classroom
- the school
- the LEA
- the SEA
- Federal level

A major characteristic of the American educational system, as compared to education in other countries, is the high degree of autonomy of each of these "levels" of organization (Wayland, 1964). For example, in some crucial ways, the teacher is "alone" in his classroom and the delivery of his services rests on how he teaches. At the school level, the principal

fundamentally affects, and has responsibility for, such system problems as social control, the sequential organization of programs and activities, allocation of staff and resources, and the attainment of goals set largely by other levels of organization. At the LEA level, the school districts (as operated by superintendents who are responsible to school boards) handle finances, establish curricula, and allocate personnel including most particularly the hiring, firing, promoting, and transferring of administrators and teachers. Few formal links exist between school districts. At the SEA level, states are legally vested with authority to provide for education, state educational agencies exercise their responsibility in very different ways across the different states.

We can reduce some complexity of this organization of organizations by dealing with the system in a *block-recursive* fashion rather than considering all possible interactions and interdependencies. That is, for the sake of simplification, we can ignore many feedback loops and assume that (a) lateral suborganizations affect each other only exogenously in cases of lateral dissemination, (b) vertical suborganizations above the LEA affect the LEA only exogenously, and (c) within the LEA (excepting such mega-districts as New York and Los Angeles) the interdependencies seem too great *a priori* to be able to ignore feedbacks among the various vertical levels. The following schematic diagram indicates the nature of the linkages.



In short, within suborganizations analysis can ignore some of the complex links between systems and focus on *endogenous processes* with *exogenous inputs*.

More specifically, it is important and relevant to ananlyze how state agencies operate in order to design Federal policy that can affect SEA

practices (or prevent SEAs from subverting Federal policy). And it is important to determine the effect of SEAs on local practice. However, we assume the two questions can be analyzed independently. Moreover, one can assume, in the short run, that LEAs do not affect the operation of the state agencies. Similar assumptions can be made for the relationships between Federal and SEA's and between Federal and LEAs. Thus, it makes sense for research to have several foci namely, analyses of operation *within* Federal policy making, *within* State agencies, and *within* LEAs and analyses of the links (or "inputs") from one organization to another.

Since the revised Rand Study Design for the Change Agent Program, November 1973, outlines Rand's approach to the analysis of Federal policy making (Section III) and of the SEAs, this paper will discuss only the analysis of LEAs.

B. COMMON LEA STRUCTURE AND PROCESSES

Despite all the autonomy of LEAs, an identifiable institutional framework links the various parts of the elementary and secondary school system together into a highly stable educational system. That is, comparing organizations laterally (from classroom to classroom, from school to school, from district to district, from state to state), considerable commonality exists at comparable levels: (a) the formal authority relationships *within* classrooms, schools, school districts, and states are quite similar; (b) the formal authority links *between* the levels are quite similar; (c) at corresponding lateral levels, the roles played by individual actors (teachers, principals, superintendents, etc.), their incentive structures, and the organizational constraints on their behavior are similar; (d) the organizational ideology (the goals of educators, and basic beliefs about how schooling out to work) is similar throughout the system; and (e) the pressures from the various public interests are similar.

The existence of this institutional framework suggests that regardless of the considerable differences between school districts in such crucial areas as their student needs and characteristics, their political and cultural environment, their economic and social context, and their organizational and

human resources, innovative projects will be exposed to similar structures and processes within LEAs. We are not arguing that differences between schools (as well as differences within school) do not affect the outcomes of innovative projects. On the contrary, they do. We are arguing that a generalizable understanding of project effects -- and, indeed, of schooling itself -- should include an analysis of common LEA structure and processes.

Thus, a task for research is to identify the common organizational elements characteristic of LEAs and to analyze how they affect the innovative project. The literature on organizations and on diffusion of innovations suggests some abstract elements to be examined by research.

In particular, many organizational theorists point to the following elements as being essential to understanding the operation of an organization:

1. The *informal organization* that coexists with the formally defined bureaucracy represented by organization charts and that consists of individual goals and beliefs and of patterns of power, prestige, interaction, and friendships.
2. The *unanticipated consequences* that seem inevitably to attend the commands of leadership and would be expected to follow deliberate change no matter how well planned.
3. The *structure of personal incentives* and *constraints* that motivate individual behavior and limit individual action.
4. The *routinized behavior* that establishes the basic patterns of authority and communications within any stable organization.
5. The *decisionmaking* apparatus that identifies who decides what, when, and how.
6. The *leadership* that enables principle actors to get things done.*

Through describing the substance of these elements for a school district might be essential to a full understanding of an LEA's operation, such

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*For reviews of organization literature, see March and Simon, 1958; Katz and Kahn, 1966; March, ed., 1965; Argyris, 1970; Etzioni, 1961.

description is probably not feasible in general nor quite to the point of the study of change processes. We are essentially concerned with what happens when an innovative project impinges upon a school district. Innovative projects may be directed at an individual, group or social system, but whether "change" actually occurs as a result of the introduction of a new program depends on whether or not the program actually results in modification or restructuring of the routinized patterns or organizational behavior leading to the incorporation of new patterns. From this view, the problem of "movement without change" can be diagnosed as the absence of new patterns of organizational behavior. That is, the adoption of a program can be pro forma, leaving the central structure of the relationship between administrator and principal, principal and teacher, teacher and teacher, and/or teacher and pupil unaffected. Therefore, a central task of research is to *identify elements of the organization susceptible to being changed by innovative projects.*

Usually projects are evaluated in terms of their outputs rather than in terms of what they reveal about the nature of change processes in education. By adopting the view that the wide variety of change agent projects attempted at the local level during the past decades can be analyzed as a range of stimulii to which LEAs responded, research be able to identify the susceptibility to change of various LEA components.

We previously argued that the innovative project itself "mutates" as it becomes implemented. An innovative project is a plan stating goals and means designed to change educational practices or procedures. During its implementation, the "plan" becomes developed, operationalized, and often revised according to the nature of its institutional setting.

Thus, another central research task is *to determine which aspects of the organization affect the implementation of the innovative project, in what ways, and to what extent.* This task directs the research towards examining the decision-making structure and processes of the LEA.

The organization literature suggests that understanding who decides what, when, and how is fundamental for uncovering the policy levers in an

organization (Simon, 1957, Cyert and March, 1963). The bureaucratic roles displayed by organization charts strongly condition the way authority is distributed. However, they do not fully determine the actual exercise of influence for several reasons:

i. an organizational "decision" is usually comprised not of a single step, but of many decisions made by many actors.

ii. the influence any particular actor has on an organizational decision varies according to the nature of the decision.

Therefore, research must go beyond the formal organization and attempt to describe the reality of decisionmaking. The organizational literature argues that the loci of decisionmaking become regularized in stable systems such as an LEA; we shall refer to these loci as *decision points relative to a specific type of decision*. For example, the superintendent -- or, at least, the superintendent's office -- usually makes choices about allocation of resources, budget, curriculum, managerial structure, and selection of special programs. The teacher is engaged in a very different but nonetheless significant set of choices.

Insofar as research can determine the decision points relative to the process of implementation, a more differentiated change policy might be developed that deals with incentives and constraints appropriate to the actual influence of different actors. As a guide to such research, it is useful to formulate a model of the implementation process in terms of critical decisions. In particular, drawing upon the literature on the diffusion of innovation (Rogers, 1962, Rogers and Shoemaker, 1971), we posit that the process of implementation consists of *discrete stages* in the sense that (a) at distinct phases in the process, decisions have to be reached and (b) the beginning of a new stage is contingent upon the decision at the end of the preceding stage. In short, in addition to the structural decision points discussed earlier, innovation evokes dynamic decision points.

Before offering a simple model of the stages of innovation appropriate to change agent projects, several obvious implications from the above

conceptualizations can be drawn. First of all, the decision points at the beginning and end of each stage represent levers at which policy can intervene. The question for research is to determine what policy instruments can be effectively brought to bear on the actors involved at different decision points. Secondly, because decision points occur over time as well as over the structure, the combinations of institutional response to a given change agent increase rapidly, thereby compounding the problem of identifying where, and understanding why, efforts to innovate break down. That is, different components of the educational institution will interact with different stages of the innovative process in different ways, and with different weights at different times. This multiplicity of decision points produces the mutation phenomenon and renders each case of implementation unique. Yet, since implementation within an LEA involves common processes in similar organizational structures, we suspect that systemic regularities can be discovered. The challenge to research lies precisely in discovering these regularities underlying the innovative process.

Many models of stages of innovation formulated in the literature assume a reality in which *"rational"* choices can be made, in which technological innovations can be transferred *invariantly* from adopter to adopter, and in which change is *internally* desired and generated. However, experience suggests that the reality of the institutional nature of school districts is quite different: rather than rational choice, bureaucratic incentives and constraints, and political opportunities and conflicts are the norm; rather than invariant transfer, innovative projects usually are mutated; rather than internally generated desires for change, educational systems typically react because of exogenous pressures. Accordingly, instead of the usual five-stage model of planned change developed by Rogers (1962),* we propose a three-stage process of change:

- o support
- o adaptation
- o incorporation

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*Rogers' five-stage model consists of: (1) awareness; (2) interest; (3) evaluation; (4) trial; (5) adoption. (P. 81.)

Support: This notion includes the concepts of "search," "needs assessment" and "selection." The introduction of a change program into a school or district requires a series of decisions by individual actors within the local policy system to support the program. This notion of support rejects the assumption implicit in many Research and Development models of innovation -- that information in and of itself is a motivating force to change. The concept of support posits that information on new practices is a necessary but not a sufficient antecedent to innovation. A more important consideration is whether the "time is right" from the perspective of the actors in the education system. Without a high level of support within the system for an innovative idea, it is unlikely that the process of innovation will get under way, despite the *prima facie* merits of the proposed change.

Adaptation: Adaptation denotes the stage of the change process in which the proposed innovative plan confronts the reality of the system it is designed to change. The term adaptation is used because it underscores the simultaneous effects of introducing change into an educational system: that is, the change project undergoes transformation by being adapted by the existing system and, for successful change projects, the existing system adapts to the demands of the project. Many actors have inputs at different points throughout the process of adaptation: district administrators, principals, teachers, students, parents, visitors, community members, press, professionals, members of other educational policy units, and so on. As a result of these varying inputs, a process of formative evaluation goes on continually. As a result of this ongoing evaluation of a proposed change, any number of decisions concerning the innovative project may be made. For example:

- principal actors may do nothing about the feedback they have received
- actors may modify project goals
- actors may modify project practices
- additional resources may be sought
- actors may seek new or different resources

- o there may be a return to pre-project behavior
- o staffing patterns may be modified
- o the project may be prematurely discontinued.

Incorporation: The term incorporation is used to denote the final stage in implementation. The literature refers to this stage in a number of ways: "continuation," "adoption," or "achieving a terminal relationship." (Lippitt, Watson and Westly, 1958, use this latter term.) For the purposes of change agents, the term incorporation more accurately represents the last stage of innovation -- the point at which an innovative practice ceases to be "new," and becomes part of the routinized behavior of the institutional system.

The stage of incorporation (or failure to incorporate) is similar to the initial stage of the innovative process in the sense that support must be generated. However, incorporation differs from the initial stage in several major ways:

i. due to adaptation, the project as realized in the final stage is likely to be different from its initial conceptions

ii. because actors make decisions during the life of the project, a set of constituencies is created by subtle psychological processes of cognitive dissonance and less subtle political calculations of who gets what and who loses what

iii. as the project moves from an experimental status to a legitimate permanent status, it gathers an organizational momentum on the one hand, and detractors threatened by dislocations, on the other hand

iv. new decision points relative to reallocation of personnel, redistribution of resources, and redesign of curriculum becomes activated

To summarize, the Rand research on Change Agent programs should deal with two central inquiries: (1) to determine the impact of innovative

projects on the structure and processes of LEAs in order to identify those aspects of the educational system susceptible to being changed, and (2) to determine which aspects of the LEA's structure and processes affect the implementation of the innovative project, in what ways, and to what extent. Because the organizational nature of the LEA plays such an important role in these inquiries, the following features should be examined in the research: the informal organization, unanticipated consequences of innovative projects, individual incentives and constraints, routinized behaviors, leadership, and the decision-making structures. And, in particular, these organizational features should be examined as they impinge upon the implementation process. We propose that this process can be conceptualized as consisting of three stages: (1) support, (2) adaptation, and (3) incorporation.

C. A CONCEPTUAL MODEL

The preceding section outlined major concerns of research directed towards understanding implementation of innovative projects and the ways policy might affect this process. This section recasts these broad research questions into more operational concerns by (a) proposing a conceptual model that identifies major factors involved in change processes in an LEA and (b) suggesting potential measures of these factors.

Many impact studies reviewed in Section II implicitly assume a naively simple view of change processes. In effect, the innovative project impinges on the black box of the educational system and produces an output of changed student outcome. Based upon the discussion of the preceding sections, Figures 1 and 2 propose a conceptual "model" that unpacks the black box. The equations in Figure 1 should be viewed as schematic for it is unlikely that the Rand study could specify the functions, identify the system of equations, or make sufficiently precise measurements of the variables to render this "model" fully operational. Each "variable" is symbolic of a category of concern that would be composed of a vector (or a more complex configuration) of attributes. The model's purpose is to identify the critical research questions and suggest concretely how

we view the relationships between the project, its setting, and the impacts of the project.

The model consists of three sets of equations corresponding to the three stages of the change process -- support, adaptation, and incorporation -- evoked by an innovative project. We shall discuss each stage in turn.

We assume that the *support* for a particular innovative plan will be a function of the initial characteristics of the plan, of the institutional characteristics of the LEA, of the characteristics of the community in which the LEA is embedded, and of Federal and State policy. Support, as a vector of dependent variables, might be operationalized in terms of various measures of (a) the *resource commitment* of the LEA to the innovative project (e.g., local funding allocated to the project and the quantity and quality of staff development) and (b) the *personal backing* of individual actors (e.g., superintendent's and principal's expressed support and teachers' voluntary willingness to participate).

Federal and State policies provide various incentives to the local school district to support innovative projects. A broad goal of the overall Rand study is to suggest how Federal policy *can* effect change and with what policy instruments. We deal with this question in two ways. First of all, we can examine directly how Federal policy *has* affected LEAs. In particular, for the analysis of support suggested by equation (1), Federal policy inputs can be operationalized (a) in broad terms by comparing ESEA Title III (State and Federal), Vocational Education, ESEA Title VII (bilingual), and Right To Read and (b) in specific terms of variables cutting across and within programs (e.g., levels of funding, guidelines, and restrictions). Similar remarks apply to comparative SEA analysis.

However useful the above analysis might be, they are unlikely to provide a definitive guide to the broad question of devising appropriate change policy. Such direct empirical analysis deals with what is or has been. But since the range of policy instruments represented in present programs is relatively narrow, what is may be different from what could be. In short, it is possible that, in the relatively brief period of Federal attempts

Support (1) $S = F(P^\circ, I^\circ, C^\circ, Fed, State)$

Adaptation

Student Outcome (2) $O_{it} = g(O_i^\circ, B_i, F_i, G_i, C_i, P^t, I^t)$

Institutional Outcome (3) $I_j^t = k(P^\circ, I^\circ, P^t, C, S)$

Project Implementation (4) $P^t = h(P^\circ, I_{n-j}^\circ, I_j^t, S)$

Incorporation (5) $I^{t+1} = 1(I_j^t, I_{n-j}^\circ, P^t, O^t, C, Fed\ State)$

where

S	is a (column) vector of support measurements
P°	is a (row) vector of initial project characteristics as indicated by its plan
I°	is a vector of initial LEA characteristics
C°	is a vector of initial community characteristics
Fed	is a vector of Federal inputs
State	is a vector of SEA characteristics
O_{it}	is a vector of educational outputs of the i^{th} student at time t
O_i°	is a vector of initial educational outputs (before the initiation of the innovative project) of the i^{th} student at time t
B_i	is a vector of innate endowments of the i^{th} student
F_i	is a vector of family influence on the i^{th} student cumulative to time t
C	is a vector of community influences on the project that includes both initial community characteristics and those that change exogenously during the life of the project
C_i	is a vector of community influences on the i^{th} student cumulative to time t
P^t	is a vector of project characteristics cumulative to time t
I_j^t	is a vector of j institutional characteristics changed by project cumulative to time t (i.e., endogenous changes)
I_{n-j}°	is a vector of j-j institutional characteristics not changed by project (i.e., exogenous)
I^{t+1}	is a vector of incorporated institutional characteristics

Fig. 1 -- Conceptual Model of Factors Affecting Change in LEAs

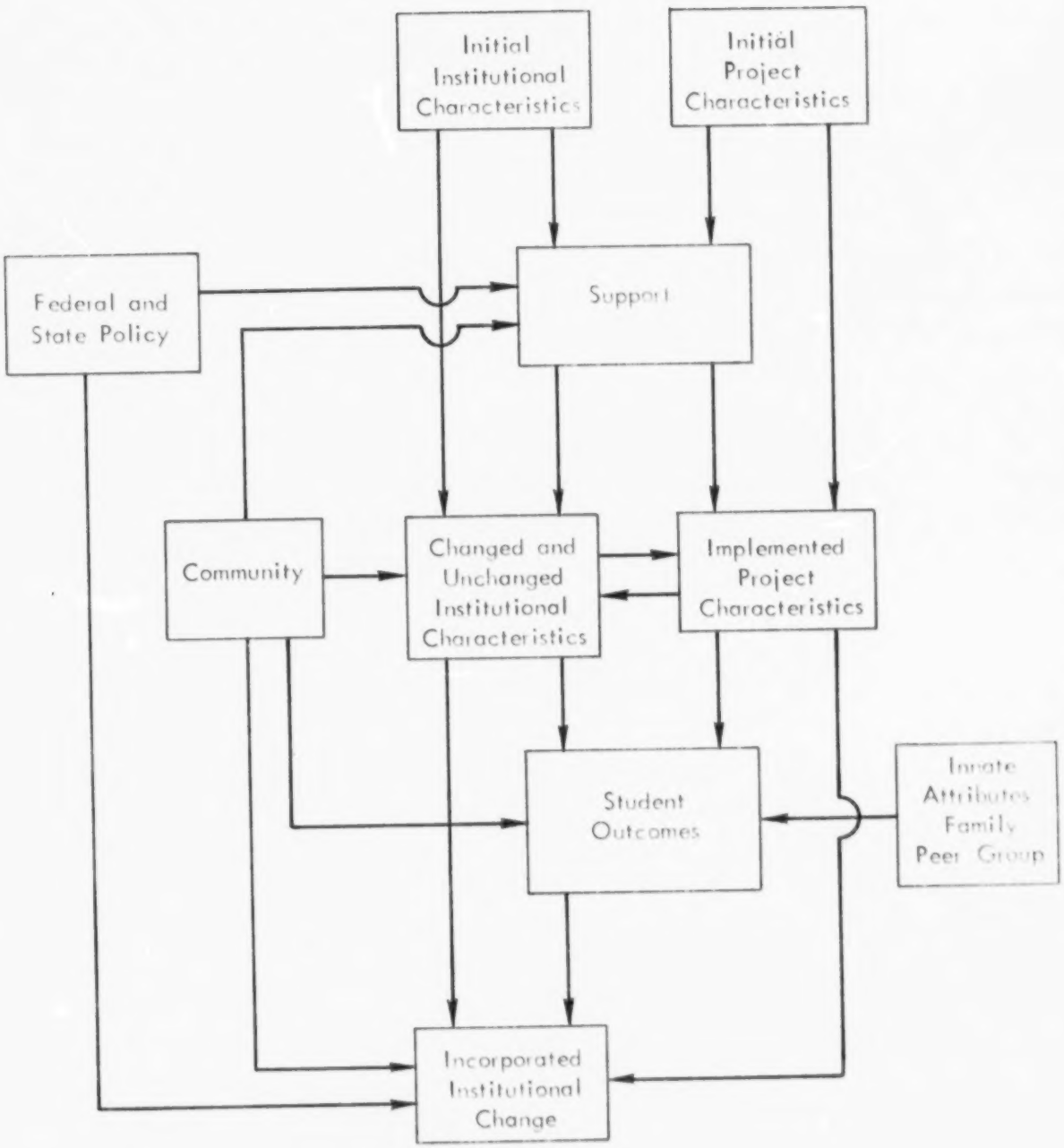

Fig. 2 — Schematic Diagram of Factor Affecting Change in LEA

to foster innovation in elementary and secondary education, the "best" policy has not yet been devised. In terms of our model, we propose that Federal policy enters exogenously into the support equation (and the incorporation equation) but not into the adaptation equations; this identification reflects the finding of the Ford Foundation, and others, that funding agencies have impact primarily at the initial stage (The Ford Foundation, 1972). Yet, policy could conceivably affect adaptation if appropriate policy instruments were applied to those aspects of the institution susceptible to change. Of course, an object of research is to locate these policy levers by pursuing the lines of inquiry suggested by Figure 1 and the preceding sections.

The political and demographic characteristics of the community in which the LEA and its constituent schools are embedded affect support by producing *pressure* for change, by *constraining* the possibilities of change, and by presenting the *need* to change in the characteristics of the student population. Urban-ruralness, ethnic and racial composition, community size, median age of residents, and tax base represent relevant demographic characteristics whose effects need to be explored; the level of unrest in the community, the level of community involvement in school affairs, and the type of school board are relevant political characteristics.

Institutional characteristics can affect support in a wide variety of ways and, of course, determining the extent to which candidate characteristics have significant effect is an objective of research. For convenience, institutional characteristics can be divided into *organizational status*, *attributes of principal actors*, and *organizational capacity to innovate*. Among organizational status measures might be*

- o Wealth
- o Level of per pupil expenditure
- o Amount of budgetary slack
- o Pattern of resource use

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*During research, these measures need to be differentiated according to the institutional level pertinent to the innovate project. Thus, some variables might be measured for the school district or individual schools or individual classrooms or grade levels or a combination of these levels.

- o Size
- o Age and condition of facilities
- o Racial and SES composition
- o Pupil/teacher ratio
- o Staff mobility patterns
- o Staff age patterns
- o Number of graduates entering college
- o Drop-out rate

Among the attributes of such principal actors as the superintendent, principal, and project directors might be

- o Level of education
- o Age
- o Length of tenure in present position
- o Location and nature of previous position
- o Salary level
- o Experience with innovative projects
- o Amount and type of interaction with local, state and national groups
- o Membership in professional groups

Among the measurements of the organizational capacity to innovate might be

- o innovativeness propensity (an index of (a) the number and rate of widely diffused educational practices in the district and (b) the nature and number of simultaneous new educational practices in the district)
- o locus of decisionmaking (for budget decisions, curriculum, and allocation of resources and personnel)
- o research and development capacity
- o leadership styles (authoritarian, democratic, etc.)

The P° in equation (1) symbolizes the view that initially an innovative project is an input new to the district though not necessarily a unique idea invented by the LEA. The project itself is a plan consisting of a statement of

goals and *means* usually justified in terms of the needs of its target group. In addition, the innovative project implies personal consequences for individual actors that affect their willingness to support the project. Developing adequate conceptualizations of these project characteristics presents a major challenge to the Rand study. Our current, tentative thinking suggests that project characteristics can be usefully divided into *perceived educational objectives, perceived personal consequences, perceived institutional effects,* and *project techniques and strategy.*

Of these broad categories, the perceived institutional effects requires especially careful conceptualization since operational measurements that are too fine-grained may lead to each project being classified uniquely. Higher level concepts of the following type may provide groupings which allow generalizability:

- o centrality (the degree of displacement of central and routinized behavior which might accompany incorporation of an innovative project)*
- o consonance (the degree of consequence, fit, or compatibility between the perceived goals and practices of an innovative project and pre-existing institutional characteristics).

However, since these variables are difficult to operationalize, a typological approach to classifying the perceived institutional effects of a project might be more useful. For example, a scheme suggested by Pincus (1973)

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*The education literature talks about the notion of centrality in terms of "mainline" vs. "ancillary" innovative strategies. The addition of an art appreciation project, or the introduction of a zoo education program, might be examples of ancillary change. Incorporation of these programs in a district's menu of educational services, despite the effectiveness of the project in meeting its own goals, will result in little change in the core institutional practices or patterns of behavior. Because these projects have little centrality, they represent only marginal change in district routine. The new math curriculum or differentiated staffing strategies, on the other hand, are "mainline" innovation efforts. They are concerned with the core of a district's instructional program and require -- if they are to be successful -- substantial reorientation and new learning on the part of teachers and district personnel. Of course, school districts often employ "ancillary" projects for strategic purposes. For example, an "ancillary" project may be adopted to pave the way for more basic change.

categorizes projects into the type of change being attempted:

- o change that increases the level of resource use only
- o change that affects the resource mix
- o change that affects instructional processes or methods without altering resource level or mix
- o change that affects administrative management without significant alterations on organizational power structure
- o change that affects either the organizational structure of the school or the school's relation to external authority.

Turning to the middle set of equations representing the adaptation phase in Figure 1, the three simultaneous equations are based upon the view that three endogenous changes can take place when an innovative project impinges on an LEA -- student outcomes, institutional changes, and project changes.

Equation (2) assumes that the project (and the changes it causes in the institution) is only *one* of the inputs affecting student outcomes. Indeed, it may be a relatively *marginal* input. Student outcomes (however measured) are the result of the student's innate endowments, influence from the family, peer group and community, and the characteristics of school experience not affected by the project (Levin, 1971). Most agree that estimating the effects of schooling on student outcomes is an extremely difficult task. If such estimates, and the underlying theory, were available, then a fuller understanding of long-run implications of an innovative project would be possible. Yet, developing a satisfactory understanding of the effects of schooling is beyond the scope of the Rand inquiry. Nonetheless, some measures of student outcome are necessary for they reflect the short-run "success" of innovative projects and they provide an input to the incorporation decision. A standardized measure, such as achievement levels on cognitive tests, would not be desirable (or feasible) for all projects since the educational objectives of change agent projects differ widely. Instead, operational procedures need to be devised that measure the degree to which objectives, whether stated or implied, are met *relative* to the *initial level of the target group* on these objectives.

Such measures will probably be aggregate measures of the target group performance (rather than either individual measures or overall school district measures). Moreover, they may necesarily rely on the perceptions and judgments of local participants in the project. To reduce some of the obvious bias involved in these indicators, composite measures that average or weight the various perceptions of actors at the same and at different levels might be useful.

Equation (3) represents changes in the institution that occur as the result of the innovative project. These changes may be those anticipated by the initial project plans or unanticipated consequences of implementation. In any event, unless significant institutional changes occur (and are incorporated), improvement in student outcomes will not be stable.* Significant changes may occur if there are alterations in *routinized procedures*, in the *loci of decision-making*, in the *roles of individual actors*, and in the creation of *specialized and differentiated staff*. Direct, or proxy, measures of these institutional affects may be useful. In addition, given the need for comparability, the operationalization of more abstract concepts such as the degree of centrality may prove fruitful.

Equation (3) also identifies community characteristics as a factor that influences institutional outcomes. These community characteristics would include attributes that change exogenously during the life of the innovative project as well as those that do not.** For some types of projects requiring high levels of community involvement, it may be necessary to consider the simultaneous effect of the project on the community.

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*In the ideal equation (2) would be used to estimate the significance of various alterations in the LEA for student outcomes.

**For example, since local educational systems are accountable to the local and national community, the weights and priorities assigned to various goals and objectives at any given time can be expected to change as values and preferences shift in the broader policy setting. Even if a clearly defined set of educational objectives could be specified, then, it would be risky (and an insurance of obsolescence) to take them as a "given" or a single standard to employ in the construction of theory or in the development of measurement instruments.

As previously argued, the initial plans of a project become developed, operationalized, and altered during its implementation. Equation (4) proposes that the implemented project is a function of the characteristics of initial plans, those aspects of the institution changed by the project, those aspects of the institution *not* changed by the project including elements that resisted change as well as those features exogenous to the implementation, and the support for the project.

Among those initial characteristics of the project expected to affect implementation (in addition factors previously cited) are such elements of technique and strategy as

- o prior planning and testing
- o specificity of goals and means
- o flexibility
- o complexity
- o allocation of resources
- o staff development

Among the institutional characteristics (in addition to those previously cited) that might affect implementation are

- o degree of principal and/or superintendent *involvement*, *support*, and *accessibility*
- o degree of reciprocity within schools
- o degree of staff participation in decision-making
- o teachers' perception of autonomy or activity control

Unlike the support stage, the incorporation of a project by a LEA can draw upon the project's actual performance, effects, and history and can reflect an evaluation of the costs and benefits of the project relative to other alternatives. Equation (5) conceptually expresses these considerations. One indicator of incorporation might be the decision of the LEA to *continue* an innovative project after federal funds have been exhausted. However, in using this indicator, care has to be taken to differentiate which aspects are being continued and to what extent. At a more abstract level, incorporation might be measured by the degree to

which it involves (a) *incremental* changes to established routines, (b) *expansions* of the existing repertoire by new elements, or (c) *replacement* of previous institutional patterns of behavior.

To summarize, we proposed a conceptual model of factors affecting change processes in an LEA and various potential measures of these factors. Though this model undoubtedly will be revised as the research proceeds, the critical concepts, propositions, and system of relationships suggested by the model and by the discussion of preceding sections should help formulation of operational procedures for understanding how the educational system implements innovations.

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